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(54) Title: A METHOD AND APPARATUS FOR PROVIDING SIGNAL ANALYSIS OF A BIONEMS RESONATOR OR TRANSDUCER

(57) Abstract: An outputs signal, $v(t)$, is generated from a bioNEMS transducer and mixed with a reference signal and then filtered to generate a correlator output, $r(t)$. The correlator output is detected to generate a signal $u(t)$ and then determined whether the signal $u(t)$ satisfies a predetermined threshold. If qualified, it is then decided whether the signal $u(t)$ represents a predetermined type of interaction between a free ligand in a fluid in which the NEMS device is immersed and a receptor attached to the transducer. The threshold is the Neyman-Pearson criterion based on a predetermined probability of false detection, P_{fa} . The interaction may be binding of a free ligand to the receptor or releasing a bound ligand from the receptor by competitive binding with the free ligand. The step of detecting comprises detecting the envelope of the signal, $r(t)$.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/14286

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G01N 33/50

US CL : 702/19

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 702/19, 20-25, 27-33, 41-44, 56, 115, 189-191, 193-195; 435/7.1; 436/518, 524, 501; 73/61.75, 580; 700/266

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4,847,193 A (Richards et al) 11 July 1989 (11.07.1989), column 2, line 8 - column 3, line 47.	1, 9, 21, 29
A	US 6,118,124 A (Thundat et al) 12 September 2000 (12.09.2000), Figure 7.	1-40
A, P	US 2003/0033876 A1 (Roukes et al) 20 February 2003 (20.02.2003), Figure 2.	1-40
A, P	US 2003/0043925 A1 (Stopler et al) 06 March 2003 (06.03.2003), paragraph 109.	2, 10, 22, 30
A, E	US 2003/0137216 A1 (Tamayo de Miguel et al) 24 July 2003 (24.07.2003), paragraph 7.	1-40

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

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later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

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"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

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INTERNATIONAL SEARCH REPORT

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Continuation of B. FIELDS SEARCHED Item 3:

USPAT, US-PGPUB, EPO, JPO, DERWENT, IBM_TBD, IEEEEXPLORE

search terms: nanoelectromechanical, microelectromechanical, bionanoelectromechanical, bioNEMs, bioMEMs, biofunctionalized, , oscillator, free ligand, ligand, receptor, transducer